No single factor explains the comfort and quality of life in the 21st century as well as our ability to enlist external forms of energy to do work for us. From the alarm that wakes us in the morning to the tools that animate our lives, almost everything we touch is either powered by — or has been created, changed or moved by — some form of energy. British Columbia has a particular wealth of electricity resources. Colourless, odorless, safe and instantly available, clean electricity is also endlessly renewable.

But while it arrives at the flick of a switch, electrical energy cannot be mustered with the snap of your fingers. The electricity that heats our homes, lights our streets and powers our industries is generated in many regions of the province and delivered over thousands of kilometres of transmission and distribution lines. Along the way, it is measured and adjusted, moment by moment, to meet the changing needs of all British Columbians. Put too much electricity into the system and it will overload and crash; too little and the entire economy could grind to a halt.

Given the long lead time necessary to build new power generation facilities and transmission infrastructure, BC Hydro must plan well into the future to ensure a continued flow of clean, safe, reliable and cost-effective electricity. This draft Integrated Resource Plan (IRP) describes the actions BC Hydro recommends to meet growing demand so that our customers will continue to receive affordable, clean and reliable electricity. The draft Plan includes consideration of the most recent changes in the electricity demand forecast and reflects input gathered in 2011 from First Nations, stakeholder and public consultation. Once again, we are interested in your feedback.
## TABLE OF CONTENTS

- **WE WANT TO HEAR FROM YOU** ................................................................. 2  
- **ABOUT BC HYDRO** .................................................................................. 3  
- **CONSULTATION 2011** ............................................................................ 4  
- **THE INTEGRATED RESOURCE PLAN** .................................................... 5  
- **FORECAST DEMAND: HOW MUCH ELECTRICITY WILL BRITISH COLUMBIANS NEED OVER THE NEXT 20 YEARS?** .......................................................... 6  
- **WHAT IS THE GAP BETWEEN EXISTING SUPPLY AND FORECAST DEMAND?** ............................................................... 8  
- **THE DRAFT INTEGRATED RESOURCE PLAN: HOW CAN BC HYDRO CLOSE THE ELECTRICITY GAP?** .................................................. 9  
  - **CONSERVE MORE** ................................................................................ 10  
  - **BUILD AND REINVEST MORE** .......................................................... 12  
  - **BUY MORE** ......................................................................................... 17  
  - **PREPARE FOR POTENTIALLY_GREATER DEMAND** ............................ 18  
- **FEEDBACK FORM** .................................................................................. 23
We Want to Hear From You

This discussion guide is offered to First Nations, stakeholders and the public as an overview of BC Hydro’s draft Integrated Resource Plan (IRP) — including the key actions that BC Hydro proposes for meeting electricity demand over the long term. BC Hydro is seeking feedback on major aspects of the draft plan.

Electricity systems are inherently complex and capital-intensive, and generally require significant lead time to construct. It can take five to six years to plan and build a new generation facility and even longer to develop transmission lines and infrastructure. So, BC Hydro must plan carefully to determine the least-cost options and keep rates affordable, to encourage conservation, and to acquire the right mix of generation and transmission resources to meet its customers’ needs.

In the process of preparing the draft, BC Hydro considered input from First Nations, stakeholder and public consultations conducted in March and April 2011. Now, BC Hydro is seeking feedback on this draft plan. Consultation will take place May 28 to July 6, 2012. BC Hydro will also be holding separate workshops for First Nations.

Consultation materials are on the BC Hydro website at bchydro.com/irp. You can provide feedback and learn more by:

- Reading more background information available online
- Completing an online feedback form
- Participating in open houses
- Participating in a webinar
- Viewing the IRP video
- Writing comments to BC Hydro

How Your Feedback Will Be Used

BC Hydro will consider feedback received through this consultation, along with technical, financial, environmental and economic development inputs, when preparing a final IRP. The plan will be submitted to the provincial government by December 2012, after which government will review the plan and decide whether to approve it.

Public Open Houses

<table>
<thead>
<tr>
<th>Community</th>
<th>Date</th>
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<th>Location</th>
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<tr>
<td>Prince George</td>
<td>Tuesday, June 5</td>
<td>6:00 – 9:00 p.m.</td>
<td>Ramada Hotel Prince George</td>
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<tr>
<td>Fort St. John</td>
<td>Wednesday, June 6</td>
<td>6:00 – 9:00 p.m.</td>
<td>Quality Inn Northern Grand Hotel</td>
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<td>Vancouver</td>
<td>Tuesday, June 12</td>
<td>6:00 – 9:00 p.m.</td>
<td>SFU Harbour Centre</td>
</tr>
<tr>
<td>Terrace</td>
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<td>6:00 – 9:00 p.m.</td>
<td>Best Western Plus Terrace Inn</td>
</tr>
<tr>
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<td>Wednesday, June 20</td>
<td>6:00 – 9:00 p.m.</td>
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<td>bchydro.com/irp*</td>
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*Please check bchydro.com/irp for further information.
ABOUT BC HYDRO

Fifty years ago, the Province of B.C. created a Crown-owned utility to plan, develop and deliver clean and reliable electricity to homes and businesses throughout most of the province. Today, BC Hydro is one of the largest electrical utilities in Canada. It serves 1.8 million customers — 95 per cent of B.C.'s population — safely, reliably and at rates that are competitive with jurisdictions across North America. Nearly 90 per cent of customer accounts are residential, with the remainder either commercial or large industrial. Each of these three groups consumes roughly one-third of the total electricity supplied.

More than 93 per cent of BC Hydro’s electricity supply is clean or renewable, creating little or no greenhouse gas emissions. This energy comes from a combination of BC Hydro’s own existing resources and from power purchased from independent power producers who generate electricity from a range of resources.

As the map shows, BC Hydro operates 31 hydroelectric facilities and three thermal generation plants that use natural gas. The major hydroelectric facilities are located in the Peace and Columbia regions.

More than 70 independent power producers also connect to the grid, contributing approximately 20 per cent of the total electrical supply. The transmission system also connects to Alberta and to Washington state, enabling BC Hydro to trade electricity for the benefit of BC Hydro ratepayers.

PROVINCIAL ENERGY GOALS

BC Hydro’s mandate is to provide British Columbians with reliable and affordable electricity. As a Crown-owned utility, it is governed by the Hydro and Power Authority Act and regulated by the British Columbia Utilities Commission under the Utilities Commission Act.

The provincial Clean Energy Act requires BC Hydro to submit an Integrated Resource Plan to the Minister of Energy by December 2012 and every five years thereafter. The Act also requires BC Hydro to be self-sufficient* by 2016 and to describe how it will respond to objectives in the Act including:

• Generate and deliver at least 93 per cent of all electricity in British Columbia through clean or renewable sources.
• Keep rates among the most competitive in North America.
• Meet at least 66 per cent of any increase in demand through conservation and efficiency by 2020.
• Use renewable power to help achieve provincial greenhouse gas reduction targets.
• Encourage economic development and the creation and retention of jobs.
• Explore and, subject to cabinet approval, pursue the opportunity to develop and sell clean electricity into interprovincial and international markets.
• Foster the development of First Nations and rural communities through the use and development of clean or renewable resources.

* In February 2012, government amended the definition of self-sufficiency so that BC Hydro must be self-sufficient during average water conditions. The previous definition had required self-sufficiency during historically low inflows or critical water conditions.
During March and April 2011, BC Hydro sought input from First Nations, stakeholders and the public as it developed the information and conducted the analysis necessary to prepare the draft Integrated Resource Plan (IRP). During consultation, more than 700 stakeholders and members of the public attended stakeholder meetings and open houses. Participants completed 400 feedback forms and made 52 written submissions. At the same time, BC Hydro held nine First Nations regional workshops that were attended by 121 participants representing 78 First Nations, tribal councils and Aboriginal organizations. BC Hydro also sought input from the IRP Technical Advisory Committee on its analysis. For more information about the IRP Consultation program and reports summarizing the input received to date, go to bchydro.com/irp.
THE INTEGRATED RESOURCE PLAN

The Integrated Resource Plan (IRP) is BC Hydro’s plan for acquiring the resources to meet customer needs over the long term. But this is not a once-every-20-years exercise. BC Hydro will update its long-term electricity plan at least once every five years. As part of this process, BC Hydro asks three questions:

1. HOW MUCH ELECTRICITY WILL BRITISH COLUMBIANS NEED OVER THE NEXT 20 YEARS?

This depends on a host of factors that increase or decrease demand. That demand must also be understood in two ways: how much energy is required in total over the course of a year, and how much capacity might be needed to meet demand peaks, such as seasonal and daily peaks — to ensure that BC Hydro can keep the lights on, even on the coldest, darkest days.

2. WHAT IS THE GAP BETWEEN EXISTING SUPPLY AND FORECAST DEMAND?

What is the expected output of BC Hydro’s existing electricity generation, contracted energy supply and transmission assets, and to what degree might conservation and efficiency measures reduce future demand? After conservation measures are taken into account, what is the gap between existing supply and anticipated demand?

3. HOW CAN BC HYDRO CLOSE THE ELECTRICITY GAP?

What blend of additional conservation measures and additional generation and transmission resources will be needed to meet demand, reliably and cost-effectively?

By addressing these questions, BC Hydro identifies actions it must take within the next 10 years to meet its customers’ future long-term electricity needs.

BC Hydro’s Integrated Resource Plan does not, by itself, commit BC Hydro to any specific capital projects. Recommended action items will be subject to subsequent approval and consultation requirements.

WHERE WE ARE TODAY

Inputs to integrated resource planning including the resource options report, the long-term load forecast and other technical information

Identify the gap between existing supply and forecast electricity demand

What is the gap between existing resources and forecast electricity demand?

Public, stakeholder and First Nations consultation

Input into the draft plan on key planning questions

Analyze options to close the gap

Develop the draft IRP

What is the optimal blend of new conservation, generation and transmission resources?

Public, stakeholder and First Nations consultation

Gather feedback on draft plan

Consider public, stakeholder and First Nations feedback and finalize the IRP

Submit the IRP to the government of British Columbia

2010

2011

2012
**FORECAST DEMAND: HOW MUCH ELECTRICITY WILL BRITISH COLUMBIANS NEED OVER THE NEXT 20 YEARS?**

Approximately one-third of BC Hydro’s current electricity demand comes from residential customers, another third from commercial and small industrial customers (e.g., hospitals, schools and shopping malls) and the final third from large customers (e.g., pulp mills, mines). Changes in any one of these customer segments can have significant impacts on the overall growth in electricity demand.

**20-YEAR ANNUAL ENERGY LOAD FORECAST**

To ensure that it has sufficient energy to meet future demand, BC Hydro establishes a probable forecast of how much customers will need per year (the red line, below right). It also calculates the potential for higher and lower demand (the grey area around the red line). The green line indicates the anticipated demand, reduced by savings from BC Hydro’s existing conservation and efficiency plans.

In its December 2011 load forecast, BC Hydro anticipated that growth in demand from the mining and oil and gas sectors will be particularly strong. BC Hydro has included the development of two new Liquefied Natural Gas facilities proposed for the north coast of the province in the demand represented in the graph below.

The long-term load forecast shows that demand for energy could grow by approximately 50 per cent over the next 20 years, before accounting for the savings that can be achieved by conservation and efficiency measures.

While growth in population and general economic activity are relatively predictable drivers of electricity demand, it is more difficult to forecast growth in demand among large industrial customers, as this is subject to the fluctuating global market for B.C.’s natural resources.

To manage uncertainty, BC Hydro is concentrating on its most probable forecast, but is continuing to work with government and customers to manage scenarios that reflect potential additional demand.
20-YEAR PEAK CAPACITY FORECAST

In addition to examining the total energy that BC Hydro customers need in a year, BC Hydro must also ensure that it has sufficient peak capacity to meet the moment-by-moment demands placed on its system.

BC Hydro’s load forecast indicates that peak capacity demand will grow by approximately 50 per cent over the next 20 years, before accounting for the savings that can be achieved by conservation and efficiency measures.

Demand for electricity varies through the year. In British Columbia, the peak demand typically occurs in the early evening in December or January on a very cold weekday.

In the graph below, the blue line represents the projected peak capacity demand before conservation is taken into account; the green line shows the peak demand including the conservation and efficiency levels that BC Hydro believes can be delivered based on existing plans. The grey area shows the demand uncertainty.

PEAK CAPACITY refers to the maximum amount of electricity that BC Hydro can supply at any one time throughout the whole province. For example, BC Hydro’s system experiences seasonal and daily peaks in demand.

ELECTRIFICATION: SWITCHING FROM OTHER FuELS TO ELectRICITY

The Clean Energy Act seeks “to encourage the switching from one kind of energy source or use to another that decreases greenhouse gas emissions in British Columbia.” Fuel switching to clean electricity could occur across the economy. The Horn River Basin is one example of potential “electrification” – traditionally, industry burned fossil fuels to power their industrial processes; now they are considering electricity. The transportation sector is another example – switching automobiles from gasoline and diesel to electricity could help reduce the largest source of greenhouse gas emissions in B.C.

Within the IRP, BC Hydro has examined the drivers of electrification, the potential impact of electrification on the system, and when electrification might occur. Analysis shows that future carbon prices (including the regulated cost of emitting greenhouse gases) would have the strongest influence on the speed with which the transportation and industrial sectors will switch fuels and electrify. In the next 10 years, demand for electric vehicles is predicted to be relatively small, due to the availability and cost of vehicles. In the long term, electric vehicles could become a significant component of overall electricity demand and a source of distributed energy storage. BC Hydro will continue to monitor carbon prices and analyze potential system demand to accommodate fuel switching as the marketplace transitions.
**WHAT IS THE GAP BETWEEN EXISTING SUPPLY AND FORECAST DEMAND?**

A key step in long-term integrated resource planning involves comparing the energy and capacity load forecast (demand) to currently available resources (supply). When forecast demand exceeds current supply, BC Hydro must fill the gap by encouraging consumers to use less and by increasing the sources of electricity supply.

In BC Hydro’s energy supply-demand outlook (right) the blue bars show the current annual supply of BC Hydro facilities and independent power producers. The bars increase over the next three years, reflecting BC Hydro’s own operating plans and the new independent power production that is coming online. Beyond 2018, the net energy supply goes down as contracts with some independent power producers expire. BC Hydro must fill the gap between the blue bars (the existing supply) and the green line (showing anticipated demand, as reduced by conservation and efficiency measures).

Meanwhile the capacity outlook indicates that customers will need an additional 2,400 megawatts of peak capacity by 2031.

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**THE FORECAST ENERGY GAP**

**THE FORECAST CAPACITY GAP (AFTER CURRENT CONSERVATION PLAN AND BEFORE IRP ACTIONS)**

The decrease in capacity from 2012 to 2031 is due to some biomass-based Independent Power Producer contracts going off-line.
**THE DRAFT INTEGRATED RESOURCE PLAN: HOW CAN BC HYDRO CLOSE THE ELECTRICITY GAP?**

The draft Integrated Resource Plan describes the actions that BC Hydro proposes to take over the next 10 years to ensure British Columbians continue to receive low-cost, reliable electricity over the long term.

To evaluate the different options and identify the appropriate mix of resources, BC Hydro has considered the following factors:

- **Technical specifications**: the potential peak capacity and energy each resource option offers, its earliest possible in-service date, etc.
- **Cost**
- **Effect on provincial energy objectives**: e.g., the objective that at least 93 per cent of energy should come from clean or renewable sources, at least 66 per cent of any increased demand be met by conservation by 2020, and greenhouse gas emissions be reduced, etc.
- **Environmental attributes**: land, water and air footprints of projects that BC Hydro believes can be permitted.
- **Economic development attributes**: contributions to jobs, GDP and provincial revenue.
- **First nations, stakeholder, public and Technical Advisory Committee input gathered through the 2011 consultation process.**

On the following pages, BC Hydro recommends a set of actions to close the gap. It involves:

- **CONSERVING MORE**
- **BUILDING AND REINVESTING MORE**
- **BUYING MORE**

In addition, BC Hydro must also develop contingency plans to the address the “what ifs” such as what if demand grows more quickly than expected. BC Hydro has additional recommendations to:

- **PREPARE FOR POTENTIALLY GREATER DEMAND**

**FINDING THE RIGHT MIX**

Electricity sources can be divided into two categories: dependable capacity and intermittent energy.

**Dependable capacity** resources, such as large hydro reservoirs and generating stations, pumped storage facilities and natural gas-fired generators, all deliver a consistent, dependable amount of power over time.

**Intermittent energy** resources, such as wind, solar, run-of-river hydro, and tidal and wave energy, deliver power only when the wind is blowing, the sun is shining or the water is flowing.

The challenge for electric utilities is to deliver a reliable supply of electricity and operate with an appropriate balance of cost-effective, dependable capacity and intermittent renewable resources to minimize environmental impacts.

BC Hydro has many dependable capacity resources in the form of water stored behind its dams on the Peace and Columbia River systems, which can be used when needed. However, as B.C.’s capacity needs have grown over the years, BC Hydro is now having to look at new additional capacity solutions to ensure customers have energy when they need it.
**Conserve More**

**Reduce Energy Consumption**

**Recommended Action #1: Conserve More:**

a) Increase our energy savings target to 9,800 gigawatt hours per year by 2020 (1,000 gigawatt hours more than the current plan) through conservation and efficiency programs, incentives and regulations.

b) Explore more codes, standards and rate options for savings beyond the annual target of 9,800 gigawatt hours.

Conservation and efficiency, also referred to as demand-side measures (DSM), is the cleanest and least expensive way for BC Hydro to reduce the gap between future electricity demand and existing resources.

Conservation measures can include:

- Programs that provide information, education and incentives (for example, the BC Hydro Fridge Buy-Back Program).
- Specifically designed electricity rates such as the existing residential inclining block rate that encourages conservation while collecting no additional revenue for BC Hydro.
- Government codes and standards that set minimum energy performance levels for products or systems that use, control or affect the use of energy — for example, by eliminating the sale of low-efficiency light bulbs.

BC Hydro’s current conservation and efficiency plan, established in 2008, aimed to reduce current levels of consumption by 8,800 gigawatt hours per year by 2020. In analyzing how efficiency can be improved and how much energy can be conserved over a 20-year horizon, BC Hydro compared its current approach, which emphasizes a complementary mix of programs, rates and government codes and standards, against a more aggressive approach, which would rely more on government-regulated codes and standards as well as other conservation measures. This more aggressive approach would require a shift in how British Columbians use electricity — for example, new housing would need to be built more efficiently. Mandatory time of use rates would not be part of this approach, as the government has directed BC Hydro not to introduce them.

In determining how much conservation and efficiency it should recommend, BC Hydro considered:

- How much energy savings is BC Hydro confident will be delivered? (Conservation levels are uncertain because they depend upon customers adopting new behaviours and technologies.)
- At what cost can savings be achieved?
- What has been the consultation input to date?

The recommended approach will provide BC Hydro with the time needed to learn more about customers’ willingness to accept new codes and standards. Depending on results, the conservation target could be increased even more in the next Integrated Resource Plan (IRP). By targeting 9,800 gigawatt hours per year, BC Hydro expects to defer about 78 per cent of incremental demand for traditional energy loads. This target is in excess of B.C.’s **Clean Energy Act** objective to meet 66 per cent of new demand for electricity through conservation.

*BC Hydro powersmart*
ENCOURAGE LESS CONSUMPTION DURING PERIODS OF PEAK DEMAND

➤ RECOMMENDED ACTION #2: Pursue voluntary conservation programs that encourage residential, commercial and industrial customers to reduce energy consumption during peak periods.

In addition to conservation measures that target total energy savings over the course of a year, BC Hydro will improve voluntary programs designed to reduce peak demand or shift demand away from peak hours. For example, BC Hydro can work with large industrial customers to adjust their processes and equipment operations in a way that reduces consumption for short periods when needed.

For more information about BC Hydro’s Power Smart programs, go to bchydro.com/powersmart.
BUILD THE SITE C CLEAN ENERGY PROJECT

➤ RECOMMENDED ACTION #3: Build Site C to add 5,100 gigawatt hours of annual energy and 1,100 megawatts of dependable capacity to the system for the earliest in-service date, subject to environmental certification and fulfilling the Crown’s duty to consult and, where appropriate, accommodate Aboriginal groups.

The Site C Clean Energy Project is a proposed third dam and hydroelectric generating station on the Peace River, downstream from the existing BC Hydro reservoirs and the G.M. Shrum and Peace Canyon generating stations. In preparing the Integrated Resource Plan, BC Hydro compared the efficiency, environmental attributes and cost of Site C against other renewable resources (wind, run-of-river hydro) that could meet the same annual energy and peak capacity requirements in the same time frame. BC Hydro also compared Site C against other peak capacity options, including natural gas and pumped storage. The analysis generally showed the following:

- Portfolios of resource options with Site C would have lower costs to ratepayers and would provide additional flexibility to integrate intermittent renewable resources.
- Portfolios that include Site C would generally have a greater footprint on land, with the creation of a new reservoir, although portfolios excluding Site C would require a greater number of projects with more dispersed environmental footprints.

As the third project on the Peace River, Site C would benefit from storage and regulation by upstream facilities. For example, Site C would generate approximately 35 per cent of the annual energy produced at the W.A.C. Bennett Dam, with five per cent of the reservoir surface area.

- Portfolios including Site C generally provide higher levels of GDP and employment resulting from project construction.

With a total project cost of $7.9 billion, it would produce electricity at a cost of between $87 and $95 per megawatt hour at the point of interconnection.

SITE C:

- Supports the provincial clean energy, self-sufficiency and climate change objectives by providing energy and capacity with low greenhouse gas emissions intensity.
- Projected to provide 35,000 direct and indirect jobs, supporting the provincial objective of encouraging economic development and job creation.
- Facilitates the development of wind and run-of-river hydro that require backup from a dependable and flexible resource.
The streams of BC Hydro-led consultation are outlined below.

- **Government Liaison**
  BC Hydro is engaging key municipal, regional and provincial government stakeholders to ensure they are kept up to date on the status of the project.

- **Property Owner Liaison**
  Ongoing meetings and two-way information sharing with property owners is continuing throughout the Site C project.

- **Local Area Consultation**
  BC Hydro will conduct area-specific consultations where local issues arise. For example, consultation with the community of Hudson’s Hope was held in fall 2011 to gather local input about proposed berm options.

- **Aboriginal Consultation and Engagement**
  BC Hydro and Aboriginal groups are engaged in a thorough consultation and engagement process that continues through all stages of the Site C Clean Energy Project.

- **Project Definition Consultation**
  Project Definition Consultation is designed to consult and engage with the public and stakeholders on topics important to project planning and the environmental assessment.
  - Project Definition Consultation, Spring 2012, held between April 10 and May 31, asked the public and stakeholders for input about Highway 29 Preferred Realignments, Outdoor Recreation and the 85th Avenue Industrial Lands.
  - Project Definition Consultation, planned for fall 2012, will include consultation topics such as worker accommodation and reservoir clearing.

For more information about Site C, the work of the joint review panel and the opportunities for consultation and input, visit bchydro.com/sitec.
BC Hydro initiated the Resource Smart program in 1988 to identify and implement efficiency gains at existing BC Hydro facilities. The program provides additional annual energy and peak capacity by modifying, updating and retrofitting our existing generation facilities. Recently, BC Hydro began the addition of the fifth and sixth generating units at Mica Generating Station. These investments will ensure that the backbone of our system remains strong and reliable.

The Revelstoke Generating Station, which was designed to accommodate six generating units, opened in 1984 with four units and a combined peak capacity of 1,980 megawatts. With the addition of a 500-megawatt fifth unit in 2010, Revelstoke now provides more than 20 per cent of BC Hydro’s total peak capacity.

A sixth turbine in the Revelstoke Generating Station would increase BC Hydro’s peak capacity, helping to ensure that electricity is available during peak hours during the coldest periods of winter.

While BC Hydro has completed a large number of Resource Smart projects over the past 20 years and has other generation refurbishment plans underway, there are still some remaining ways to modify, update and retrofit our existing generation facilities to secure additional energy and peak capacity. Upgrading the existing system through the Resource Smart projects can provide additional energy production and peak capacity on the system in a cost-effective way, with generally low or no incremental environmental impact.
A short-term capacity gap emerges in 2015 before new projects such as Revelstoke 6 and Site C come online and provide additional peak capacity. To fill this short-term gap until alternative resources are developed, BC Hydro proposes relying on cost-effective and readily available resources to meet customers’ growing requirements.

During this gap period, BC Hydro plans to continue to purchase capacity from the marketplace via the western electricity grid to ensure that customers’ growing peak requirements can be met. BC Hydro considers the purchasing of out-of-province power to meet peak needs to be a prudent, low-cost choice prior to a large resource like Site C coming online.

The Canadian Entitlement is a feature of the Columbia River Treaty between Canada and the United States, under which Canada operates its dams on the Columbia River in a way that optimizes generating potential and regulates water flow in both countries. In return, B.C. receives an “entitlement” of one-half of the extra power produced in the U.S. The actual entitlement varies annually, but is generally about 4,600 gigawatt hours of energy per year and 1,300 megawatts of capacity.

Using the Canadian Entitlement and purchasing peak capacity on the open market involves calling upon electricity from the U.S. during periods when customers’ demand peaks. Transmission line constraints on U.S. connections are such that BC Hydro can rely on no more than 500 megawatts of additional peak capacity, which means that these options alone may be insufficient to fill the peak capacity gap.

Burrard Thermal Generating Station is a major generating facility located in the Lower Mainland and is valuable as an emergency backup resource. The plant is available with government approval to meet demand in the Lower Mainland in the event that peak demand exceeds available resources, or on an emergency basis. BC Hydro has, on average, called upon Burrard 12 days per year during the past three years to meet peak demand and to provide emergency backup for generation and transmission outages.
TRANSMISSION REQUIREMENTS

➤ RECOMMENDED ACTION #7: Reinforce the existing 500-kilovolt line from Prince George to Terrace to meet new demand on the north coast.

B.C.’s bulk high-voltage transmission system is the backbone of the grid that delivers electricity to customers across the province. It carries electricity from where it is generated to the cities, towns and industrial centres where it is largely consumed. To meet expected demand, BC Hydro has concluded that no new high-voltage inter-regional transmission lines are needed in the next 20 years. However, the existing 500-kilovolt line from Prince George to Terrace will need to be reinforced to meet new demand on the north coast. Consultation and project definition studies have begun to move forward on reinforcing this line to ensure it keeps its earliest in-service date.

In addition, BC Hydro must:

- Complete committed transmission line projects, including the Interior-to-Lower Mainland (ILM) and Northwest Transmission Line (NTL).
- Address region-specific transmission needs. For example, oil and gas industry expansion is driving rapid growth in the South Peace area.

30-YEAR TRANSMISSION PERSPECTIVE

In recent years, the provincial government and utilities have become increasingly concerned about timely development of transmission infrastructure. In addition, transmission lines often require long lead times to develop (10 or more years) and rights-of-way can be difficult to secure.

Therefore, BC Hydro looked farther into the future — 30 years out — to see if a longer perspective leads to new conclusions. Extending the transmission planning horizon from 20 to 30 years validated the transmission choices identified in the initial 20-year horizon. No new transmission options were identified as a result of extending the planning horizon.

BC Hydro also considered whether pre-building new transmission would be beneficial in areas where a high number of clean generation projects were expected to be clustered in the next three decades. The analysis shows only marginal economic and environmental benefits from pre-building into areas with high generation potential in advance of need. At the same time, pre-building may also cause unnecessary environmental impacts and costs in the event the transmission need does not materialize.

BC Hydro will continue to take a proactive approach to transmission planning. In future acquisitions processes for new electricity, BC Hydro will identify potential opportunities to cluster generation facilities and avoid multiple transmission lines.
While conservation is our first and preferred strategy to meet customers’ future electricity requirements, made-in-B.C. power is still required to help close the gap between supply and demand. British Columbia is fortunate to have a wealth of potential clean resources, including hydroelectricity, biomass and wind. The B.C. Clean Energy Act objective that at least 93 per cent of B.C.’s electricity generation comes from clean or renewable sources allows for not more than seven per cent of generation from sources such as natural gas-fired generation.

ENERGY FROM B.C.-BASED CLEAN ENERGY PRODUCERS

BC Hydro has been purchasing power through long-term contracts with independent power producers for over 20 years. During fiscal 2011, independent power producers supplied 10,805 gigawatt hours of annual energy — about 20 per cent of all BC Hydro electricity requirements — while also contributing to the Province’s self-sufficiency, clean energy generation, and greenhouse gas reduction objectives.

Independent clean energy producers can bring new projects online in five to six years and in smaller increments that match B.C.’s electricity demand growth. As BC Hydro’s long-term forecast is updated in late 2012 and future demand is confirmed by customers, new energy can be acquired through acquisition processes involving affordable long-term contracts at fixed energy prices. Acquisitions from independent power producers also help to meet the Clean Energy Act objective of fostering the use and development of clean or renewable energy in First Nations and rural communities.

Based on its assessment of potential generation resources, BC Hydro expects the majority of new power will come from low-cost resources such as wind, run-of-river and biomass projects because these are currently the lowest-cost options. However, producers will have the opportunity to propose other forms of renewable power projects such as geothermal, wave and tidal for consideration.

BC Hydro plans to continue the Standing Offer Program for projects less than 15 megawatts as well as the Net Metering Program for small residential and commercial projects. BC Hydro also plans to assess and potentially expand the opportunities for geothermal resources as well as other distributed generation sources that are not participating in existing acquisitions programs.
As part of good utility practice, BC Hydro must have contingency plans in case electricity requirements grow faster than forecast, or if planned resources don’t come online when expected.

BC Hydro is paying particular attention to two areas of the province where there is potential for greater load growth from development in the large industrial sector. While this new demand is difficult to forecast with certainty, it warrants careful examination now because of the large volumes of energy and capacity that could be required and the unique geographic challenges associated with serving major new loads in northern B.C.

NORTH COAST: LIQUEFIED NATURAL GAS AND MINING DEVELOPMENT

➤ RECOMMENDED ACTION #9: Continue to work with LNG developers to understand their electricity requirements, and keep options open until further certainty on future requirements can be established. Specifically:

- Undertake work to maintain the earliest in-service date for a new 500 kV transmission line from Prince George to Terrace and Kitimat and from the Peace River region to Prince George.
- Develop procurement options for additional clean energy resources, backed up by gas-fired generation (located only in the north coast, or in both the north coast and across the province) for electricity that could be delivered in the 2019–2020 time frame, should it be needed.

In addition to the two Liquefied Natural Gas (LNG) facilities that are included within the IRP’s base resource plan, BC Hydro is aware of a number of other LNG and new mine developments on the north coast — a potential investment of approximately $20 billion that could also create many new jobs. The process of converting natural gas into a liquefied state consumes large amounts of energy. Usually, that energy is provided on-site by burning natural gas. BC Hydro is working with industry and the provincial government to determine how BC Hydro could meet the LNG industry’s energy needs via clean electricity backed up by natural gas-fired generation, thereby reducing related greenhouse gas emissions.

The provincial government has committed to having three LNG plants in operation by 2020 being serviced by clean electricity and backed up by gas. Related provincial goals include:

- Ensuring that B.C. is competitive in the global Liquefied Natural Gas (LNG) market.
- Maintaining leadership on climate change and clean energy.
- Keeping energy rates affordable for families, communities and industry.

BC Hydro has sufficient current and planned energy supply to meet the energy needs of the first two of three potential Liquefied Natural Gas facilities. BC Hydro is studying supply options to meet possible additional electricity demand that could emerge if a third LNG plant is established in the longer term or if other additional electricity demand emerges.
NORTHEAST: NATURAL GAS EXTRACTION

➤ RECOMMENDED ACTION #10: Continue to monitor the northeast natural gas industry and undertake studies to keep electricity supply options open, including transmission connection to the integrated system, and local gas-fired generation.

BC Hydro is looking at the potential that large new natural gas extraction will emerge in the Horn River Basin in northeast B.C. and that the gas industry will seek electrical power from BC Hydro. The Horn River Basin encompasses a large area northeast of Fort Nelson that is not currently connected to BC Hydro’s integrated transmission system. Gas production in the Horn River Basin requires energy for two purposes: moving gas through pipelines, and processing the gas to remove impurities such as carbon dioxide (formation CO₂) and hydrogen sulphide (H₂S). Traditionally, the natural gas industry has met its own energy requirements by burning natural gas or diesel. However, the industry could be electrified — thereby reducing related greenhouse gas emissions and helping to achieve provincial climate change goals.

Two broad alternatives to serve this potential demand are:

- Building a new northeast transmission line to bring new clean energy to the region via the integrated system.
- Acquiring gas-fired electricity generated locally. Additional clean generation resources may also be added; however, these will not displace the need for gas as a backup.

BC Hydro is working with the provincial government, industry and potential independent power producers in assessing the options for serving the Horn River Basin.

PEAK CAPACITY RESOURCES

➤ RECOMMENDED ACTION #11a: Working with industry, explore pumped storage capacity options to reduce the lead time to in-service dates and to develop an understanding of where and how to site such future resources in the province, should they be needed.

➤ RECOMMENDED ACTION #11b: Working with industry, explore natural gas-fired generation options to reduce the lead time to in-service dates and to develop an understanding of where and how to site such future resources in the province, should they be needed.

In its base resource plan, BC Hydro recommends a combination of additional resources to address the forecast growth in peak capacity requirements. As discussed, BC Hydro has been able to rely on additional capacity within its large hydroelectric system to address growing capacity demands over the past two decades and, as part of this plan, will study how it can tap into the remaining Resource Smart opportunities on its existing facilities. Going forward, finding additional capacity resources will be more challenging. Renewable resources such as wind and run-of-river supply options cannot store energy. This means that when the wind doesn’t blow or rivers do not have adequate flows, BC Hydro needs to rely on other resources to meet demand. Now, for contingency planning purposes, BC Hydro must look beyond the base plan recommended actions and address what if growth is even greater than expected or other resources don’t come online when expected.
**Pumped storage** involves taking advantage of the fact that reservoirs make excellent batteries: the water can be held for long periods and released through generating turbines only when necessary to meet electricity demand.

Utilities have the ability to recharge these batteries by using electricity to pump water from a lower reservoir to a higher reservoir when electricity is plentiful and cheap (in the middle of the night, or at times of the year when demand is low). Then, during periods of high electrical demand (i.e., at dinnertime on a cold, dark day), the stored water is re-released through the turbines to produce electricity when it is needed most. The pumping process makes the plant a net consumer of energy, but this storage of water for peak capacity gives significant additional flexibility to meet customers’ electricity requirements.

Pumped storage projects are generally sited close to high-demand centres (to minimize electricity losses and the need for transmission lines) and in locations with a significant elevation difference. With high mountains near the major load centre in the Lower Mainland and on Vancouver Island, B.C. is well suited to pumped storage. However, such projects have not been built in B.C. before and the construction time for such a large project would be significant.

After B.C. Hydro exhausts Resource Smart projects, **natural gas** is the next-lowest-cost alternative for adding additional capacity to the system and therefore best addresses keeping electricity rates affordable. Natural gas-fired plants can be located close to where the electricity is needed, reducing the need to build new transmission lines.
CONSERVE MORE

REDUCE ENERGY CONSUMPTION
1. Conserve More:
   a) Increase our energy savings target to 9,800 gigawatt hours per year by 2020 (1,000 gigawatt hours more than the current plan) through conservation and efficiency programs, incentives and regulations.
   b) Explore more codes, standards and rate options for savings beyond the annual target of 9,800 gigawatt hours.

ENCOURAGE LESS CONSUMPTION DURING PEAK DEMAND PERIODS
2. Pursue voluntary conservation programs that encourage residential, commercial and industrial customers to reduce energy consumption during peak periods.

BUILD AND REINVEST MORE

BUILD THE SITE C CLEAN ENERGY PROJECT
3. Build Site C to add 5,100 gigawatt hours of annual energy and 1,100 megawatts of dependable capacity to the system for the earliest in-service date, subject to environmental certification and fulfilling the Crown’s duty to consult and, where appropriate, accommodate Aboriginal groups.

TAKE ADVANTAGE OF RESOURCE SMART OPPORTUNITIES
4. Begin work to allow the sixth generating unit at Revelstoke Generating Station to be built by 2018, adding 500 megawatts of peak capacity to the BC Hydro system.
5. Continue to investigate and advance cost-effective Resource Smart projects to utilize the remaining untapped capacity within BC Hydro’s existing hydroelectric system.

COMBINE READILY AVAILABLE RESOURCES TO MEET THE SHORT-TERM CAPACITY GAP
6. Fill the short-term peak capacity gap from 2015 to 2020 with a combination of market purchases first, power from the Columbia River Treaty second, and extending the existing backup use of Burrard Thermal Generating Station, if required and authorized by regulation.

REINFORCE TRANSMISSION
7. Reinforce the existing 500-kilovolt line from Prince George to Terrace to meet new demand on the north coast.

BUY MORE

ENERGY FROM B.C.-BASED CLEAN ENERGY PRODUCERS
8. Develop energy procurement options to acquire up to 2,000 gigawatt hours per year from clean energy producers for projects that would come into service in the 2016 – 2018 time period.

PREPARE FOR POTENTIALLY GREATER DEMAND

POTENTIAL ADDITIONAL LARGE INDUSTRIAL DEMAND
9. Continue to work with LNG developers to understand their electricity requirements, and keep options open until further certainty on future requirements can be established. Specifically:
   • Undertake work to maintain the earliest in-service date for a new 500-kV transmission line from Prince George to Terrace and Kitimat and from the Peace River region to Prince George.
   • Develop procurement options for additional clean energy resources, backed up by gas-fired generation (located only in the north coast, or in both the north coast and across the province) for electricity that could be delivered in the 2019 – 2020 time frame, should it be needed.
10. Continue to monitor the northeast natural gas industry and undertake studies to keep electricity supply options open, including transmission connection to the integrated system, and local gas-fired generation.

PEAK CAPACITY RESOURCES
11. a) Working with industry, explore pumped storage capacity options to reduce the lead time to in-service dates and to develop an understanding of where and how to site such future resources in the province, should they be needed.
   b) Working with industry, explore natural gas-fired generation options to reduce the lead time to in-service dates and to develop an understanding of where and how to site such future resources in the province, should they be needed.

BC Hydro’s Integrated Resource Plan does not, by itself, commit BC Hydro to any specific capital projects. Recommended action items will be subject to subsequent approval and consultation requirements.
From an environmental and economic development perspective, the province’s clean energy, conservation, self-sufficiency and greenhouse gas reduction policies have guided BC Hydro in this plan, minimizing environmental impacts and supporting economic development. Beyond that, BC Hydro also compared the environmental footprints and economic development attributes of different portfolios. More information on the outcomes of BC Hydro’s portfolio analysis is available in Chapter 6 of the draft IRP available online at bchydro.com/irp.

The diagram below left summarizes how BC Hydro proposes to close the energy gap — first through cutting energy demand through conservation, then filling the remaining gap through a combination of energy from B.C.-based clean energy producers and Site C.

The diagram below right summarizes how BC Hydro proposes to close the gap between peak capacity requirements and existing resources, both in the short-term (the 2017 time frame) and the longer term (2021 and 2031).

As BC Hydro works toward fulfilling future electricity requirements, it will continue to monitor emerging new demand closely and be ready to adjust course as needed. In particular, forecast new demand from the liquefied natural gas industry requires close attention, as new LNG demand will arrive in substantial segments, versus growing slowly and incrementally over time.
A PLAN TO MEET B.C.’S FUTURE ELECTRICITY NEEDS

CONSULTATION FEEDBACK FORM
MAY 28 TO JULY 6, 2012
BC Hydro is forecasting that demand for power will increase by about 50 per cent over the next 20 years. In order to meet that demand reliably, affordably and within guidelines set by the B.C. Clean Energy Act, BC Hydro has created a plan to: conserve more, build and reinvest more in existing facilities, buy more made-in-B.C. energy, and prepare to meet potentially greater demand if required. Please provide your feedback about the following set of recommended actions for meeting B.C.’s future electricity needs.

➤ CONSERVE MORE

REDUCE ENERGY CONSUMPTION

1. a) BC HYDRO RECOMMENDS CONSERVING MORE BY:
   - Increasing our energy savings target to 9,800 gigawatt hours per year by 2020 (1,000 gigawatt hours more than the current plan) through conservation and efficiency programs, incentives and regulations.

   a) Please indicate your level of agreement with this recommendation.

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   b) Please indicate the reasons for your level of agreement:


1. b) BC HYDRO RECOMMENDS CONSERVING MORE BY:
   - Exploring more codes, standards and rate options for savings beyond the annual target of 9,800 gigawatt hours.

   a) Please indicate your level of agreement with this recommendation.

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ENCOURAGE LESS CONSUMPTION DURING PEAK DEMAND PERIODS

2. BC Hydro recommends pursuing voluntary conservation programs that encourage residential, commercial and industrial customers to reduce energy consumption during peak periods.

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BUILD THE SITE C CLEAN ENERGY PROJECT

3. BC Hydro recommends building Site C to add 5,100 gigawatt hours of annual energy and 1,100 megawatts of dependable capacity to the system for the earliest in-service date, subject to environmental certification and fulfilling the Crown’s duty to consult and, where appropriate, accommodate Aboriginal groups.

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TAKE ADVANTAGE OF RESOURCE SMART OPPORTUNITIES

4. BC Hydro recommends beginning work to allow the sixth generating unit at Revelstoke Generating Station to be built by 2018, adding 500 megawatts of peak capacity to the BC Hydro system.

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5. BC Hydro recommends continuing to investigate and advance cost-effective Resource Smart projects to utilize the remaining untapped capacity within BC Hydro's existing hydroelectric system.

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6. BC Hydro recommends filling the short-term peak capacity gap from 2015 to 2020 with a combination of market purchases first, power from the Columbia River Treaty second, and extending the existing backup use of Burrard Thermal Generating Station, if required and as authorized by regulation.

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REINFORCE TRANSMISSION

7. BC Hydro is recommending reinforcing the existing 500-kilovolt line from Prince George to Terrace to meet new demand on the north coast.

a) Please indicate your level of agreement with this recommendation.

- Strongly Agree
- Somewhat Agree
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- Strongly Disagree

b) Please indicate the reasons for your level of agreement:

ENERGY FROM B.C.-BASED CLEAN ENERGY PRODUCERS

8. BC Hydro recommends developing energy procurement options to acquire up to 2,000 gigawatt hours from clean energy producers for projects that would come into service in the 2016–2018 time period.

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As part of prudent utility practice, BC Hydro must have a contingency plan in case electricity demand grows faster than forecast, or one of the planned resources does not come online when expected.

**POTENTIAL ADDITIONAL LARGE INDUSTRIAL DEMAND**

9. BC Hydro recommends continuing to work with Liquefied Natural Gas (LNG) developers to understand their electricity requirements, and keep options open until further certainty on future requirements can be established. Specifically:

- Undertake work to maintain the earliest in-service date for a new 500-kV transmission line from Prince George to Terrace and Kitimat and from the Peace River region to Prince George.

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10. BC Hydro recommends continuing to monitor the northeast natural gas industry and undertake studies to keep electricity supply options open, including transmission connection to the integrated system, and local gas-fired generation.

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PEAK CAPACITY RESOURCES

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HOW INPUT WILL BE USED
Feedback received through consultation on the draft Integrated Resource Plan will be considered, along with any other final inputs, as BC Hydro prepares a final Integrated Resource Plan for submission to government for review and approval. A Consultation Summary Report summarizing feedback received through consultation will be posted on BC Hydro’s website at bchydro.com/irp and will be included in the plan submitted to government.

FEEDBACK DEADLINE:
Please submit your feedback by JULY 6, 2012.

Are you a: ❑ BC Hydro customer  ❑ BC Hydro employee  ❑ Other

Please provide your contact information (optional):
Name: 
Address:  Postal Code: 
Phone:  Email: 

Consent to Use Personal Information
I consent to the use of my personal information by BC Hydro for the purpose of contacting me and keeping me updated about future consultations on integrated resource planning. For the purposes of the above, “my personal information” includes name, mailing address, telephone number and email address, as provided above.

Signature:  Date: 

BC Hydro is collecting information for its Integrated Resource Plan in accordance with BC Hydro’s mandate under the Hydro and Power Authority Act, the BC Hydro Tariff, the Clean Energy Act and related Regulations and Directions. If you have any questions regarding the information collection undertaken on this form, please contact the IRP Project Team Administrator at 1 888 747-4832.

For further information or to submit your feedback form:
BC Hydro Integrated Resource Plan
Email: integrated.resource.planning@bchydro.com
Web: bchydro.com/irp
Mailing Address: P.O. Box 2850, Vancouver, B.C. V6B 3X2
• **ATTRIBUTE** A characteristic that describes a resource option or portfolio, used to assess its performance in meeting the planning objectives.

• **BASE LOAD** An amount of electricity committed or available over a period of time at a steady rate.

• **BRITISH COLUMBIA UTILITIES COMMISSION (BCUC)** An independent regulatory agency of the provincial government operating under and administering the Utilities Commission Act. The BCUC regulates BC Hydro’s domestic supply and rates, and the safety and reliability of the BC Hydro system, as well as operating, management and administrative costs, and also assesses concerns from ratepayers regarding BC Hydro’s service.

• **BULK TRANSMISSION** The transfer of electricity on the major high-voltage transmission system that carries the majority of power from the generators to the lower-voltage distribution systems.

• **CANADIAN ENTITLEMENT** is a result of the Columbia River Treaty between Canada and the United States in which Canada agrees to operate its dam on the Columbia River in a way that optimizes hydroelectric power-generating potential in both countries. In return, Canada receives one-half of the extra power potential in the U.S.

• **CAPACITY** The instantaneous power output or electricity demand at any given time, normally measured in kilowatts (kW) or megawatts (MW). A transmission facility’s ability to transmit electricity at any instant.

• **CLEAN OR RENEWABLE ENERGY** is defined by the Clean Energy Act as including biomass, biogas, geothermal heat, hydro, solar, ocean, wind or other prescribed resources.

• **COGENERATION** The simultaneous production of electrical or mechanical energy and useful heat energy from a single fuel source.

• **COLUMBIA RIVER TREATY** A treaty signed in 1961 between Canada and the U.S. that enabled storage reservoirs to be built and operated in British Columbia to regulate Columbia River flows to the U.S. for power production and flood control.

• **CONSERVATION** Reducing energy consumption. For example, turning off unused lights to conserve resources.

• **CURTAILMENT** A reduction in demand as a result of demand-side management.

• **DEMAND** Customers’ requirement for electric power.

• **DEMAND-SIDE MANAGEMENT** Actions, programs and initiatives aimed at modifying or reducing energy consumption through conservation and energy efficiency.

• **DEPENDABLE CAPACITY** The amount a plant can reliably produce when required, assuming all units are in service, measured in megawatts (MW). Factors external to the plant affect its dependable capacity. For example, streamflow conditions can restrict the dependable capacity of hydrot plants and fuel supply constraints can impact thermal plant dependable capacity. Planned and forced outage rates are not included. The dependable capacity used for long-term planning is the maximum capacity that a plant/unit can reliably provide for three hours in the peak load period of weekdays during two continuous weeks of cold weather.

• **DISPATCHABLE** A resource whose output can be adjusted to meet various conditions including fluctuating customer demand, weather changes, outages, market price changes and non-power considerations.

• **DISTRIBUTION SYSTEM** Electrical lines, cables, transformers and switches used to distribute electricity over short distances from substations to the customer, generally at voltages lower than 69 kV.

• **EFFICIENCY** The effective rate of conversion of a natural resource (e.g., electricity) to usable energy; the effective rate of conversion of electricity to an end use (e.g., heating).

• **ELECTRICITY** A type of energy fuelled by the transfer of electrons from positive and negative points within a conductor.

• **ELECTRICITY PURCHASE AGREEMENT (EPA)** The contract that defines the terms and conditions by which BC Hydro purchases electric energy from Independent Power Producers.

• **ELECTRIFICATION** is the process of switching from an alternative power source to electricity. Some examples include switching from gasoline-powered cars to electric cars, replacing diesel generators, or using electrical conveyor systems instead of diesel trucks in mining operations.

• **EMERGING TECHNOLOGIES** Technology at the first stages of development or demonstration. Not readily available in commercial markets and not in commercial use, as evidenced by at least three generation plants generating energy for a period of not less than three years, to a standard of reliability generally required by good utility practice.

• **ENERGY** The amount of electricity produced or used over a period of time, usually measured in kilowatt hours, megawatt hours and gigawatt hours.

• **ENERGY CAPABILITY** is the amount of energy that can be generated under specified conditions by a generating unit or by the electric system over a period of time, typically expressed in GWh/year.

• **FIRM ENERGY** refers to electricity that is available at all times. Resources typically providing firm energy include large hydroelectric dams, bioenergy, geothermal and natural gas.

• **GREENHOUSE GASES (GHG)** Gases that contribute to global climate change, or the “greenhouse effect,” including carbon dioxide, nitrous oxide and methane.

• **GRID** A network of distribution or transmission lines.

• **GWH** stands for gigawatt hour, a unit of electrical energy equal to one billion watt hours.

• **INDEPENDENT POWER PRODUCER (IPP)** A non-utility-owned electricity-generating facility that produces electricity for sale to utilities or other customers.

• **INTEGRATED SYSTEM** An interconnected network of transmission lines, distribution lines and substations linking generating stations to one another and to customers throughout a utility’s service area. Excludes customers located in remote locations who are connected via transmission facilities in the system to satisfy the needs in future years.

• **INTEGRITY** Electric supply that fluctuates or is not available at all times. For example, wind energy only produces power when the wind is blowing.

• **LIQUEFIED NATURAL GAS** is natural gas that has been cooled sufficiently that it will liquify under normal pressure.

• **LOAD** The amount of electricity required by a customer or group of customers.

• **LOAD FORECAST** The expected amount of electricity required to meet customer needs in future years.

• **MW** stands for megawatt, a unit of electrical power equal to one million watts.

• **OUTAGE** A planned or unplanned interruption of one or more elements of an integrated power system.

• **PEAK CAPACITY** The maximum amount of electrical power that generating stations can produce in any instant.

• **PEAK DEMAND** The maximum instantaneous demand on a power system. Normally, the maximum hourly demand.

• **PORTFOLIO** A group of individual resource options to be acquired in a sequence over time to fill customers’ future electricity needs.

• **POWER** The instantaneous rate at which electrical energy is produced, transmitted or consumed, typically measured in kilowatts (kW), kilowatt hours (kWh), megawatts (MW), or megawatt hours (MWh).

• **POWER SMART BC** Hydro’s demand-side management initiative to encourage electrical energy consumption efficiency by its customers. Originally launched in 1989, Power Smart includes a full range of DSM programs aimed at BC Hydro’s residential, commercial and industrial customers.

• **RATE** Term used for a utility’s unit price of service.

• **RATE STRUCTURE** Represents the set of rates paid by a class of customers (e.g., residential) for use of electricity.

• **REINFORCEMENT** Improvements in the transmission system to maintain or increase reliability and security of supply.

• **RELIABILITY** A measure of the adequacy and security of electric service. Adequacy refers to the existence of sufficient facilities in the system to satisfy the load demand and system operational constraints. Security refers to the system’s ability to respond to transient disturbances in the system.

• **RESERVE STORAGE** The volume available in a reservoir to hold water for power generation or flood control.

• **RESOURCE OPTION** A source of electricity that is available to help meet or reduce electricity demand, including generation, purchases, demand-side management and transmission facilities.

• **RUN-OF-RIVER** A hydroelectric facility that operates with no significant storage facilities.

• **SCENARIO ANALYSIS** A set of planning scenarios that test the long-term performance of a portfolio.

• **TAC** A Technical Advisory Committee (TAC) was established to provide technical input and feedback to assist BC Hydro in creating a well-considered Integrated Resource Plan (IRP). Members of the TAC are made up of stakeholders who are metropolitan and rural, and include representatives from the public, First Nations and stakeholders. Materials can be found on bchydro.com/irp.

• **TRANSMISSION SYSTEM** Electrical facilities used to transmit electricity over long distances, usually at voltages greater than 69 kV.

• **VOLTAGE** The strength of electro motive force (EMF).
For more information, please visit: bchydro.com/irp.

You can also provide feedback and learn more about the Integrated Resource Plan by:

- Attending a public open house: bchydro.com/irp
- Online feedback form: bchydro.com/irp
- Written submissions: integrated.resource.planning@bchydro.com or P.O. Box 2850, Vancouver, B.C. V6B 3X2
- Toll-free phone: 1 888 747-4832